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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,158	12/14/2001	Jorgen S. Nielsen	555255012301	1731

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EXAMINER	
PERILLA, JASON M	

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 04/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/017,158	NIELSEN, JORGEN S.	
	Examiner	Art Unit	
	Jason M Perilla	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 December 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *22-29* is/are allowed.

6)☒ Claim(s) *1-6,13,14 and 17-19* is/are rejected.

7)☒ Claim(s) *7-12,15,16 and 21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/25/2002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-29 are pending in the instant application.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on March 25, 2002 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Objections

3. Claims 1-16 and 21 are objected to because of the following informalities:

Regarding claim 1, in line 8, "the signal-to-noise ratio" is lacking antecedent basis.

Regarding claim 12, "the value of r_o represented" should be replaced by –the value of r_o is represented--.

Regarding claim 21, the claim is objected to because, in line 14, setting the first scalar value to the second scalar value is indefinite in view of the method steps in the claim. It is suggested by the Examiner that the scalar parameter would be set to the second value rather than the first value being set to the second value.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 4, 13, 14, and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley et al ("A Generalized RAKE Receiver for Interference Suppression", IEEE Comm. Vol. 18: No. 8, August 2000; hereafter "Bottomley" – cited in IDS March 25, 2002).

Regarding claim 1, Bottomley discloses 1 an Adaptive Generalized Matched Filter (AGMF) or generalized rake receiver system (pg. 1536, col. 2, lines 24-29), comprising: a rake receiver (fig. 2) coupled to a spread spectrum input signal (fig. 2, ref. r(t)) that applies a vector of weight signals (fig. 2, refs. w1-wq) to the spread spectrum input signal to compensate for dependant noise and generates a decision variable (fig. 2, ref. z; pg. 1538, col. 1, lines 18-25). Bottomley discloses the generation of weight signals (fig. 2, refs. w_1-w_q) but does not explicitly illustrate an AGMF weight determination module. However, the generation of the weight signals requires an AGMF weight determination module to create them. Further, Bottomley discloses that the output of the rake receiver or "the despread value" is sampled to determine the total noise covariance matrix ***Ru*** (pg. 1539, col. 1, lines 5-7, col. 2, lines 11-16). The sampling of the output of the rake receiver is equivalent to the limitation of "monitoring the decision variable" as understood by one having skill in the art. Although the illustrations of Bottomley do not detail feedback from the decision variable (output of the rake receiver) being fed into the AGMF weight determination module (also not shown), the body of the text does describe the despread value output of the rake receiver being sampled to determine the total noise covariance matrix ***Ru*** which is utilized by the AGMF weight determination module. Therefore, it is obvious to one having skill in the

art that the decision variable or output of the rake receiver is utilized by the AGMF weight determination module. Furthermore, Bottomley discloses that optimal values for the vector of weight signals are calculated by the AGMF weight determination module by varying the vector of weight signals until the signal-to-noise ratio of the decision variable reaches a peak value (pg. 1538, col. 1, lines 13-16; pg. 1541, col. 2, "IV. Performance Analysis"; eq. 43, pgs. 1542-1544).

Regarding claim 4, Bottomley discloses the limitations of claim 1 as applied above. Further, Bottomley discloses that the spread spectrum input signal is a Code Division Multiple Access (CDMA) signal (pg. 1536; "I. Introduction").

Regarding claim 13, Bottomley discloses the limitations of claim 1 as applied above. Further, Bottomley discloses that the rake receiver (fig. 2) comprises: a plurality of correlator fingers (fig. 2, refs. finger 1-J) that receive the spread spectrum input signal and apply a despreading signal (fig. 2, "spreading waveform correlator; pg. 1538, col. 1, lines 27-34) to generate a plurality of correlation output signals (fig. 2, $y(d_1)$-$y(d_j)$); a plurality of weight multipliers (fig. 2), each of which is coupled to one correlation output signal and one weight signal from the vector of weight signals and generates a weight multiplier output; and an adder coupled to the weight multiplier outputs from the plurality of weight multipliers that combines the weight multiplier outputs to generate the decision variable (fig. 2; pg. 1538, col. 2).

Regarding claim 14, Bottomley discloses the limitations of claim 1 as applied above. Further, Bottomley discloses that the AGMF weight determination module monitors two consecutive states of the decision variable in order to determine when the

signal-to-noise ratio of the decision variable is at the peak value (pg. 1539, col. 2, lines 24-32). That is, the inter-symbol interference covariance matrix R_{ISI} determined from the decision variable is over the desired signals previous and future values (pg. 1539, col. 2, lines 24-32) or two consecutive states.

Regarding claim 17, Bottomley discloses the limitations of the claim as applied to claim 13 above (claim 13 dependent upon claim 1).

Regarding claim 18, Bottomley discloses the limitations of claim 17 as applied above. Further, Bottomley discloses that a delay element (fig. 2, ref. "delay d-dj") is applied to the spread spectrum input signal in each of the plurality of correlator fingers in order to align the despreading signal with one multi-path cluster of the spread spectrum input signal (fig. 2).

Regarding claim 19, Bottomley discloses the limitations of claim 18 as applied above. Further, Bottomley discloses that each correlator finger includes an integrator that correlates the spread spectrum input signal over a period of time (fig. 2, ref. "spreading waveform correlator"; pg. 1538, col. 1, "A. Receiver Structure"). It is generally known in the art that a correlator integrates a received signal over a bit interval which is equivalent to a period of time.

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley in view of Rashid-Farrokhi et al (US 6304750; hereafter "Rashid").

Regarding claim 2, Bottomley discloses the limitations of claim 1 as applied above. Bottomley does not explicitly disclose that the AGMF weight determination module is one or more software modules operating on a processing unit. However,

Rashid teaches the use of a processor running one or more software modules to perform the various functions of an analogous rake receiver as illustrated in figure 1 (col. 2, lines 28-50). One skilled in the art is well aware of the benefits of the teachings of Rashid being ease of implementation and adaptability of the software modules. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize a processor running a software module or modules as taught by Rashid in the system of Bottomley because it would provide for ease of implementation and adaptability of the software modules.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley in view of Mizuguchi et al (US 6208683; hereafter "Mizuguchi")

Regarding claim 3, Bottomley discloses the limitations of claim 1 as applied above. Bottomley does not explicitly disclose that the rake receiver is further comprising a decoder coupled to the decision variable that generates a binary output. However, Mizuguchi teaches an analogous rake receiver (fig. 1) having a decoder or decision unit (fig. 1, ref. 20) coupled to a decision variable which provides a binary output (col. 5, lines 10-25). One skilled in the art would find it obvious to utilize a decoder as taught by Mizuguchi because it could be used to determine the binary bit values of the received data from the decision variable. Therefore, it would have been obvious to one having ordinary skill at the time which the invention was made to utilize a decoder coupled to the decision variable as taught by Mizuguchi in the system of Bottomley because it could be utilized to determine the actual value of the received binary data.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley in view of Kuo (US 6507604).

Regarding claim 5, Bottomley discloses the limitations of claim 4 as applied above. Bottomley does not explicitly disclose the use of a CDMA processing module coupled to the spread spectrum input signal that tracks a pilot channel in the spread spectrum input signal and generates a vector of delay elements. However, Kuo teaches an analogous rake receiver system (fig. 2 and 3a) which utilizes a pilot channel to determine the various delays of spreading codes to apply to the rake fingers (col. 3, lines 10-35). Kuo teaches the benefit of the CDMA processing module is that the pilot channel (fig. 2, ref. 210) can be used to delay (fig. 2, ref. 204) the PN sequence in each rake finger so that the received signal may be captured by multiple paths (col. 3, lines 25-30). Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize the CDMA processing module taught by Kuo in the system of Bottomley because the received signal could be captured by multiple paths. In the system of Bottomley in view of Kuo, the vector of delay elements is comprised of the individual delays applied to each of the rake finger spread code delay units.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bottomley in view of Kuo, and in further view of Rashid.

Regarding claim 6, Bottomley in view of Kuo disclose the limitations of claim 5 as applied above. Further, Rashid teaches the use of software modules operating on a processing unit as applied to claim 2 above. It would have been obvious to one having

ordinary skill at the time which the invention was made to utilize software modules processing on a processing unit as taught by Rashid in the system of Bottomley in view of Kuo because it would provide for ease of implementation and adaptability of the software modules.

Allowable Subject Matter

10. Claims 7-12, 15, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The indication of allowable subject matter is made regarding claims 21-29.

12. The following is a statement of reasons for the indication of allowable subject matter:

Claims 21-29 are indicated to contain allowable subject matter because the prior art of record does not disclose or obviate the generation of a scalar parameter which is utilized to determine the vector of weight signals. While the prior art of record, namely Bottomley, discloses the generation of the vector of weight signals according to a noise covariance matrix, the prior art of record does not disclose that the noise covariance matrix is used in combination with a scalar parameter to generate the vector of weight signals.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art of record not relied upon above is cited to further show the state of the art with respect to weighted rake receivers.

U.S. Pat. No. 6192066 to Asanuma.

U.S. Pat. No. 6067293 to Shoji.

U.S. Pat. No. 5917851 to Jarvela et al.

U.S. Pat. No. 6069912 to Sawahashi et al.

U.S. Pat. No. 6208683 to Mizuguchi et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Perilla
April 21, 2005

jmp

CHIEH M. FAN
PRIMARY EXAMINER